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ABSTRACT

This volume is the first of four volumes that comprise a curriculum guide for a postsecondary industrial maintenance program. It contains two sections. Section 1 overviews the philosophies, purposes, and goals for vocational education in Georgia. Contents of section 2 include a discussion of employability skills, description of the occupational field, program objective containing specific occupational titles, description of occupational exit points, and task listing by Dictionary of Occupational Titles code. (YLB)

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INDUSTRIAL MAINTENANCE

Post Secondary

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VOLUME I

CURRICULUM GUIDE

CE 032 074

Georgia Department of Education

INDUSTRIAL MAINTENANCE

Developed Under Contractual Agreement with

Division of Program Development
Office of Vocational Education
Georgia Department of Education
Atlanta, Georgia 30334
Charles McDaniel, State Superintendent of Schools
1981

INDUSTRIAL MAINTENANCE

VOLUME I

Developed By

The University of Georgia

Under the Direction of

Dr. Paul Scott

Vocational Education Materials Center

Division of Vocational Education

College of Education

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POLICIES AND PROCEDURES FOR THE CENTER

PURPOSE OF THE CENTER

The Vocational Education Materials Center functions within the division of Vocational Education, University of Georgia. This Center operates under grants from the U.S. Office of Education, and the Georgia State Department of Education with the support of the College of Education. The Center is comprehensive in its commitment and approach to the development and dissemination of materials in the broad field of Vocational Education.

The purpose of the Center is to increase the capability of Georgia's delivery system for Vocational Education. Specifically, the Center is committed to:

1. Develop materials to assist in the implementation of proposed curricula and to enhance the teaching Vocational Education.

2. Conduct and report curriculum research related to Vocational Education.

3. Provide a production and dissemination center to Vocational Education materials.

4. Provide direct experiences in curriculum development and diffusion for advanced graduate stduents.

5. Enable faculty members to participate in the development and implementation of a variety of curriculum materials.

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INDUSTRIAL MAINTENANCE - VOLUME I

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PURPOSE AND UTILIZATION OF THE CURRICULUM GUIDES

The purpose of this curriculum guide is to provide a suggested model for organizing vocational instructional content. In many cases, more material is available than may be needed, therefore, an instructor will need to adapt the content to meet his/her program needs.

While the guide is primarily oriented towards the classroom, whether as a primary resource or as a supplement to other teaching materials; it may also assist administrators, counselors and lay people involved in local school systems. The following outline provides an overview of the various ways these groups may utilize the curriculum guides.

a) Vocational teachers.

1. Provide a guide for organizing their program of instruction,
2. Assist in establishing program objectives,
3. Serve as a curriculum materials resource guide,
4. Improve communications with employers and advisory committees
5. Facilitate competency based instruction,
6. Facilitate either group or self-paced instruction,
7. Include content by quarter and semester,
8. Cross-reference with existing state developed instructional materials (PLACE packages and post secondary I.I.).

b) Vocational supervisors and administrators.

1. Assist in defining the scope and content of their programs,
2. Provide a means to improve curriculum management functions,
3. Serve as a guide for admissions and job placement functions,
4. Improve communications with employers and advisory committees.

c) Counseling and guidance staff.

1. Provide a data base for counseling and guidance personnel,
2. Identify student exit points (Career Options),
3. Serve as guide for admissions and job placement,

4. Correlate with new State Board of Education graduation requirements,
5. Provide specific content sequencing by quarter and semester for student scheduling,
6. Provide (a) curriculum options for the disadvantaged handicapped student, (b) curriculum modifications for SPECIAL NEEDS students, (c) typical admission requirements for regular and SPECIAL NEEDS students.

(d) Local Curriculum Coordination Committees.

1. Serve as a guide in working out articulation arrangements,
2. Improve definitions of the relationship between secondary clusters and post secondary specialized programs.

Vocational teachers, supervisors and administrators, counseling and guidance staff and local curriculum coordination committees will be primary users of this guide, however, the use of the guide is not limited to these groups, but by any and all groups directly related in designing a vocational curriculum.

-Foreword-

It has been the privilege of the Division of Vocational Education, University of Georgia, to participate in the development of 48 curriculum guides for Georgia vocational education programs. This work was sponsored by the Division of Program Development, Office of Vocational Education, State Department of Education. The completion of these guides meets a long standing need to provide a comprehensive curriculum overview of the vocational education programs available in Georgia schools. This developmental activity involved one of the largest professional staffs ever assembled for such work. Numerous teachers, teacher educators and state staff members have either written parts of the guides or served on the field review teams. These professionals were supported by a myriad of technical people and a host of typists who literally worked from dawn to dusk to ensure that the guides were produced in a timely fashion.

Be assured that this guide is not intended to be your curriculum or the curriculum of any school. The purpose of this project staff, and I am sure of the state OVE staff, is to offer a guide with supporting resources and teaching ideas from which the vocational instructor can extract a curriculum that meets local needs. The guide, however, does simplify curriculum decisions concerning sequencing and the selection of resources and media support.

The Task Linkage Project and appropriate V'TECS catalogs were used as the beginning point for this guide and all of the others. To assure that these task listings were directly related to Georgia vocational education programs and industry, they were subjected to additional study and review by appropriate teachers.

At some point in the future, this guide will need to be revised. To ensure that such a revision truly reflects the needs of Georgia's vocational education programs, the developers need your reactions, comments and ideas. We will also be interested in how you use this guide. Let us hear from you.

Paul Scott
Curriculum Guide Projects I & II

SECTION I

PHILOSOPHY, PURPOSE & OBJECTIVES

SECTION I

Section I Content List

State Philosophy and Goals
Local Philosophy and Goals

Section I provides an overview of the philosophies, purposes and goals for vocational education in the State of Georgia. These are applied to vocational education at the postsecondary level, however, it is recognized that more specific philosophies, purposes and goals will be applicable depending on the character of the local program.

VOCATIONAL EDUCATION IN GEORGIA

A. PHILOSOPHY

The Georgia Board of Education perceives vocational education as a vital component in the education of the young and adult citizens of this State. Appropriate programs of vocational education and ancillary services should be made readily available to individuals in middle schools, vocational divisions of junior colleges, vocational centers, the Quick Start program and other adult programs designed to train or retrain workers for useful and satisfying employment.

Special services and assistance must be provided to those who need it in order to participate or benefit from vocational education. This includes women, minorities, the displaced homemaker and other displaced workers, those with limited English-speaking ability, the disadvantaged and the handicapped.

Since men and women spend the greater part of their lives at some form of work, the State should provide opportunities for all its citizens to develop the knowledge, skills and attitudes necessary for them to secure personally satisfying and socially useful employment.

B. PURPOSE

The purpose of vocational education shall be to improve the economic well-being of Georgia citizens by preparing individuals, through organized learning experiences, to select, obtain and advance in recognized occupations.

POSTSECONDARY VOCATIONAL EDUCATION

A. PURPOSE

The purpose of postsecondary vocational-technical education in Georgia is to improve the economic well-being of adult citizens by providing access to high quality vocational-technical training for skilled and semi-skilled occupations, for improvement of existing skills or for retraining in a new occupation.

B. OBJECTIVES

1. To provide vocational-technical education programs and ancillary services commensurate with the needs and interests of students and available job opportunities.

2. To provide vocational-technical education programs which are current with the state-of-the-art, competency-based, and offer multiple exit points to accommodate the students' occupational objectives.

3. To provide vocational-technical education programs which are articulated with available high school counterparts, to facilitate an easy transition from secondary to postsecondary levels without loss of credit.

4. To provide vocational-technical education programs such that 75% of those individuals who leave or complete a program of occupational preparation will find employment in the field, or a related field, for which trained.

5. To provide those guidance, counseling, financial aid, evaluative, job placement, remedial and other supportive programs and services needed by students to enroll, complete a program and become, or remain, employable in a skilled or semi-skilled occupation.

6. To provide needed assistance to special populations to include women, minorities, limited English-speaking, the displaced homemaker and other displaced workers, the disadvantaged and the handicapped.

7. To provide vocational-technical education programs for full-time and part-time students on campus during the day as well as the evening hours, and to provide appropriate programs for full-time and part-time students off campus in businesses and industries, comprehensive high schools and other locations within the respective schools' service areas.

8. To serve as a center for the delivery of postsecondary and adult vocational-technical education programs and services for the community and assigned service area.

STATEMENT OF LOCAL SYSTEM PHILOSOPHY, PURPOSE AND OBJECTIVES FOR VOCATIONAL EDUCATION

(This page is intentionally left blank so that local systems may insert their copy of philosophy, purpose and goals for vocational education.)

SECTION II

PROGRAM DESCRIPTION & RELATED INFORMATION

Section II Content List

Employability Skills
Industrial Maintenance Occupational Description
Industrial Maintenance Program Objective
Definition of the D.O.T. Code
Description of Industrial Maintenance D.O.T.
Task Listing by D.O.T. Code

The major goal of vocational education in Georgia is to prepare individuals, through organized learning experiences, to select, obtain and advance in recognized occupations. Section II provides an overview of employability skills that are desirable in any occupation and relates their significance to the specific occupational area of Industrial Maintenance.

The Industrial Maintenance Program Objective contains the specific occupational titles. These occupational titles are further explained in the description of the occupational exit points and task listing. The concentration of the program is based on these tasks.

EMPLOYABILITY SKILLS

Employability skills exert a great deal of influence on a person's ability to get and keep a job. Surveys indicate that more people lose their jobs because of poor attitudes toward their job than for lack of job skills. For this reason it is important that information concerning the following employability skills be provided as an ongoing part of the program.

1. Getting a job
   a. Filling out job applications
   b. Developing a resume
   c. Preparing for a job interview

2. Keeping a job
   a. Be on time and regular in attendance
   b. Maintain a fair share of the work-load
   c. Work without supervision
   d. Meet production schedules
   e. Properly care for and use equipment
   f. Dress appropriately for the job
   g. Maintain good personal hygiene
   h. Develop and maintain good communication with supervisors and co-workers

A recent study sponsored by the Illinois Department of Adult, Vocational and Technical Education and conducted by the University of Illinois, "Survival Skills: Mastering the Human Aspects of Work", has identified twelve topics that might be developed into instructional modules for teaching occupational survival skills. The author, Robert E. Nelson, outlines these topics listed below and on the next page, each followed by a general objective which indicates the relationship between the topic and the survival skills required to maintain a job.

**1. Working in an Organization: To familiarize students with the reasons for the formation of organizations and the common characteristics of organizations.
2. Understanding Self and Others: To have students develop insights into causes of human behavior and learn to interpret their own behavior and the behavior of other.

3. Motivation for Work: To have students develop and understanding of motivations into the work they perform.
4. Interpersonal Relations: To have students develop concepts and skills in interpersonal relations and apply them to work situations.
5. On-the-Job Communication: To have students understand the importance of effective communication and learn ways of communicating effectively on the job.
6. Using Creativity on the Job: To make students aware of their creative potential and to practice using their creative ability in hypothetical on-the-job situations.
7. Authority and Responsibility: To have students develop an understanding of the concepts of authority, power, influence, and responsibility as they apply to work situations.
8. Problem Solving: To have students develop skill in applying problem solving to their work.
9. Coping with Organizational Change: To make students aware of the process of organizational change and the techniques for coping with organizational change.
10. Coping with Organizational Conflict: To make students aware of the sources and types of conflicts encountered on the job and recognize ways of coping with conflicts in an organization.
11. Leadership: To have students recognize the need for leadership in work groups and increase their understanding of the leadership role in work situations.
12. Adapting and Planning for the Future: To have students develop perspectives of work in the future and the ability to plan for anticipated changes in their work roles."

*Abstracted from the article, "Survival Skills: Mastering the Human Aspects of Work," by Robert E. Nelson, American Vocational Journal, November 1977.

INDUSTRIAL MAINTENANCE*

Nature of the Work

When a machine breaks down in a plant or factory, not only is the machine idle, but raw materials and human resources are wasted. It is the industrial maintenance mechanic's job to prevent these costly breakdowns and to make repairs as quickly as possible.

Industrial maintenance mechanics spend much time doing preventive maintenance. This includes keeping machines well oiled and greased, and periodically cleaning parts. The technician regularly inspects machinery and checks performance. Tools such as micrometers, calipers, and depth gauges are used to measure and align all parts. For example, treadles on sewing machines in the apparel industry may need adjustment and gears and bearings may have to be aligned. By keeping complete and up-to-date records, mechanics try to anticipate trouble and service machinery before the factory's production is interrupted.

When repairs become necessary, the maintenance mechanic must first locate the specific cause of the problem. This challenge requires knowledge reinforced by experience. For example, after hearing a vibration from a machine, the mechanic must decide whether it is due to worn belts, weak motor bearings, or any number of other possibilities. Maintenance mechanics often follow blueprints and engineering specifications in maintaining and fixing equipment.

After correctly diagnosing the problem, the maintenance mechanic disassembles the equipment, and then repairs or replaces the necessary parts. Hand and power tools usually are needed.

Electronic testing equipment often is included in the mechanic's tools. A maintenance mechanic may have to order new parts for a machine, or, in some instances a new part may have to be machined.

The mechanic reassembles and tests each piece of equipment after it has been serviced, for once it is back in operation, the machine is expected to work as if it were new.

Working Conditions

Industrial maintenance mechanics are not usually affected by seasonal changes in production. During slack periods, when some plant workers are laid off, mechanics often are retained to do major overhaul jobs. In addition to their regular work schedule, industrial maintenance mechanics may be called to the plant at night or on weekends for emergency repairs.

Mechanics may work in stooped or cramped positions to reach the underside of a generator, for example. They also may work from the top of ladders when repairing a large machine. These workers are subject to common shop injuries such as cuts and bruises. Goggles, metal-tip shoes, safety helmets, and other protective devices help prevent injuries.

Places of Employment

Industrial maintenance mechanics work in almost every industry in which a great deal of machinery is used. Many of the 655,000 mechanics employed in 1978 worked in the following manufacturing industries: Food products, primary metals, machinery, chemicals, fabricated metal products, transportation equipment, paper, and rubber.

Because industrial maintenance mechanics work in a wide

variety of plants, they are employed in every section of the country. Employment is concentrated, however, in heavily industrialized areas.

Training, Other Qualifications, and Advancement

Graduation from high school is preferred, but not always required, for entry into this occupation. Courses in mechanical drawing, mathematics, blueprint reading, and physics are useful for those interested in entering this trade.

Most workers who become industrial maintenance mechanics start as helpers and pick up the skills of the trade informally. Some learn the trade through apprenticeship programs.

Mechanical aptitude and manual dexterity are important qualifications for workers in this trade. Good physical condition and agility are also necessary because mechanics sometimes have to lift heavy objects or climb to reach equipment located high above the floor.

Examinations may be administered periodically to determine the mechanic's ability to maintain more advanced machinery. Some mechanics are promoted to machinists or tool-and-die makers or become master mechanics.

Employment Outlook

Employment of industrial maintenance mechanics is expected to increase much faster than the average for all occupations through the 1980's. More mechanics will be needed as manufacturers invest in more industrial machinery. Also, as machinery becomes more complex, repair work and preventive maintenance will become more time consuming. In addition, many openings will result from the need to replace mechanics who

retire, die, or transfer to other occupations.

Sources of Additional Information

Information about employment and apprenticeship opportunities in this field may be available from local offices of the State employment service or the following organizations:

International Union, United Automobile, Aerospace, and Agriculture Implement Workers of America, 8000 East Jefferson Ave., Detroit, Michigan, 48214.

International Union of Electrical, Radio, and Machine Workers, 1126-16th Street, NW, Washington, D.C., 20036.

*Occupational Outlook Handbook, 1980-81 Edition

INDUSTRIAL MAINTENANCE PROGRAM OBJECTIVE

Given appropriate instruction, as suggested by this guide, a student completing the program should demonstrate entry level skills in Industrial Maintenance in the areas of knowledge, theoretical stucture, tool usage, diagnostic ability, related supportive skills and occupational survival skills.

As the student progresses through the program, sufficient competencies will be acquired to enable the student to enter the occupational field at the following D.O.T. Codes.*

Maintenance Mechanic	(D.O.T. Code 638.281-014)
Maintenance Machinist	(D.O.T. Code 600.280-042)
Electrical Repairer	(D.O.T. Code 825.281-014)
Maintenance Repairer	(D.O.T. Code 899.281-014)
Maintenance Mechanic Helper	(D.O.T. Code 633.684-018)
Maintenance Repairer Helper	(D.O.T. Code 899.684-022)

*Dictionary of Occupational Titles, 1977 ed.

DEFINITION OF D.O.T. CODE*

As a result of technological, economic and sociological influences, nearly every job in the economy is performed slightly differently from any other job. Every job is also similar to a number of other jobs. In order to look at the millions of jobs in an organized way, job titles are designated a 9-digit occupational code. Each set of three digits in the D.O.T. Code has a specific purpose or meaning that differentiates it from all other codes.

The first three digits of the D.O.T. Code identify a particular occupational group. In the code 652.382-010, the first digit indicates an occupational category. The second digit refers to a division within the occupational category. The third digit defines a specific occupational group within a division.

The middle three digits of the D.O.T. Code 652.382-010 are the worker function rating of the tasks performed in the occupation. Every job requires a worker to function, to some degree, in relation to data, people and things. A separate digit expresses the worker's relationship to each of these three groups. Worker functions involving more complex responsibility and judgment are assigned lower numbers while functions which are less complicated have high numbers.

The last three digits of the D.O.T. Code 652.382-010 indicate the alphabetical order of titles within 6-digit code groups. They serve to differentiate a particular occupation from all others. A number of occupations may have the same first six digits, but no two D.O.T. Code can have the same nine digits.

*Dictionary of Occupational Titles, 1977 ed.

638.281-014 MAINTENANCE MECHANIC (any ind.) fixer; machine-maintenance servicer; machine overhauler; machine repairer; mechanical adjuster; repair mechanic; tool-and-machine maintainer

Repairs and maintains, in accordance with diagrams, sketches, operation manuals, and manufacturer's specifications, machinery and mechanical equipment, such as engines, motors, pneumatic tools, conveyor systems, and production machines and equipment, using handtools, power tools, and precision-measuring and testing instruments: Observes mechanical devices in operation and listens to their sounds to locate causes of trouble. Dismantles devices to gain access to and remove defective parts, using hoists, cranes, handtools, and power tools. Examines form and texture of parts to detect imperfections. Inspects used parts to determine changes in dimensional requirements, using rules, calipers, micrometers, and other measuring instruments. Adjusts functional parts of devices and control instruments, using handtools, levels, plumb bobs, and straightedges. Repairs or replaces defective parts, using hand tools and power tools. Installs special functional and structural parts in devices, using handtools. Start devices to test their performance. Lubricates and cleans parts. May set up and operate lathe, drill press, grinder, and other metalworking tools to make and repair parts. May initiate purchase order for parts and machines. May repair electrical equipment. May be designed according to machine repaired, as CARTON-FORMING MACHINE ADJUSTER (any ind.); MACHINE ADJUSTER (tobacco), MAINTENANCE MECHANIC, RECORD PROCESSING EQUIPMENT (phonograph).

600.280-042 MAINTENANCE MACHINIST (any ind.) machine repairer; shop mechanic; machinist

Sets up and operates variety of machine tools, and fits and assembles parts to fabricate or repair machine tools and maintain industrial machines, applying knowledge of mechanics, shop mathematics, metal properties, layout, and machining procedures: Observes and listens to operating machines or equipment to diagnose malfunction and determine need for adjustment or repair. Studies blueprint, sketch, machine part, or specifications to determine type and dimensions of metal stock required. Measures, marks, and scribes dimensions and reference points on metal stock surfaces, using such measuring and marking devices as calibrated ruler, micrometer, caliper, and scriber [LAY-OUT WORKER (mach. shop)]. Dismantles machine or equipment, using handtools, such as wrench and screwdriver, to examine parts for defect or to remove defective part. Substitutes new part or repairs or reproduces part from various kinds of metal stock, using hand tools, such as scraper, file and drill, and machine tools, such as lathe, milling machine, shaper, borer, and grinder [MACHINIST (mach. shop)]. Assembles and starts machine to verify correction of malfunction. Maintains and lubricates machine tools and equipment, using handtools, ladder, and lubricants. May weld

broken structural parts, using arc or gas welding equipment. May repair or replace faulty wiring, switches, or relays. May be designated according to type of equipment repaired as MACHINIST, CONSTRUCTION EQUIPMENT (any ind.).

825.281-010 ELECTRICAL REPAIRER (aircraft-aerospace mfg.)

Repairs aircraft electrical components and subassemblies, such as relays, solenoids, and wiring and cable harnesses, using handtools: Disassembles unit and removes defective parts, using handtools and soldering iron. Inserts new part in unit and solders connections. Repairs cable harnesses by replacing insulation, wire, and terminal lugs.

899.281-014 MAINTENANCE REPAIRER, FACTORY OR MILL (any ind.)
plant-maintenance worker; utility repairer, factory or mill

Repairs and maintains machinery, plumbing, physical structure, and electrical wiring and fixtures of commercial and industrial establishments in accordance with blueprints, manuals, and building codes, using handtools and carpenter's, electrician's and plumber's tools: Inspects machinery and mechanical equiment for defects. Dismantles machines or equipment to gain access to defective parts, and repairs them, using handtools. Repairs canvas, leather, or rubber drive belts and replaces them on machines. Cleans and lubricates shafts, bearings, gears, pulleys, and other parts of machine, using rags, brushes, and grease gun. Measures, cuts, and installs pipe and tubing for gas, water, and hydraulic lines, using ratchet, cutting die, and threading die. Repairs and replaces gages, valves, pressure regulators, and other plumbing equipment, and opens clogged drains, using plunger and plumbers' tools. Installs electrical equipment and repairs or replaces wiring and fixtures. Makes and repairs counters, benches, partitions, and other wooden structures, using saws, braces, bits, and other carpenters' tools. Paints walls, floors, woodwork, and fixtures of establishment, using spray gun and brushes. Replaces and repairs brick and plaster walls, using trowel. May set up and operate machines, such as lathe and milling machine, to repair or fabricate new parts. May operate gas- or arc-welding equipment to join metal parts used to repair or fabricate equipment.

633.684-018 MAINTENANCE-MECHANIC HELPER (any ind.)
machine-adjuster helper; repair helper

Assists MAINTENANCE MECHANIC (any ind.) in repairing and maintaining machinery and mechanical equipment: Carries tools and equipment to and from storage and working areas. Holds scaffolding members in place or tightens bolts to erect working platforms about machines. Pulls handlines to raise materials and tools to working levels. Loosens bolts to dismantle machinery. Drills and breaks up concrete, using jack hammer. Digs trenches for machinery foundations. Mixes and pours concrete for foundations. Cleans machines with sandpaper, solvent and wiping rags to prepare surfaces for painting. Oils and greases

machines. Performs other duties as described under HELPER (any ind.).

899.684-022 MAINTENANCE-REPAIRER HELPER, FACTORY OR MILL
(any ind.) general-maintenance helper

Assists MAINTENANCE REPAIRER, FACTORY OR MILL (any ind.) in repairing and maintaining machinery, plumbing, physical structure, and electrical wiring and fixtures of commercial and industrial establishments: Bends and cuts conduit, cuts wires, and drills holes in walls, floors, or ceilings for electrical connections. Connects wires to motors, fixtures, and other electrical equipment, replaces switches and fuses, and splices wires and insulates wires with friction tape. Bends cuts, and threads pipe, cuts openings in walls, ceilings, and floors for pipes, and seals pipe joints with sealing compound or molten lead. Dismantles machines or equipment, replaces defective parts and motors, and adjusts feed mechanisms. Performs routine maintenance on machines, such as cleaning and lubricating shafts, pulleys, gears, and bearings, using rags, brushes, grease gun, and oilcan. Cuts out and joins parts for worktables, benches, shelves, and other furnishings, using handtools and materials, such as saws, hammers, nails, and screws. Paints walls, ceilings, or fixtures of building. Patches or replaces plaster, clears clogged drains, and replaces washers. Replaces or repairs machine belts. Removes dust, dirt, grease, and waste material from machines. Paints machines or equipment to prevent corrosion. Performs other duties as described under HELPER (any ind.).

*Dictionary of Occupational Titles, 1977 ed.

TASK LISTING BY D.O.T. CODE

In this section the occupational exit points from the curriculum are cross referenced with the tasks which are required for employment in each job title. On the line following each task an x appears in the column of each job title to which to task applies. All the tasks listed in this matrix are taught in the curriculum presented in this guide. A detailed treatment of each task appears in the Unit Guides section of this curriculum guide.

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

POSSIBLE EXIT POINTS

TASK NO.	TASK NAME	DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
		DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
Duty I:	Industrial Process and Maintenance							
IPM-01	Identifying basic principles of blue-							
	print reading		X	X		X	X	X
IPM-02	Identifying elements of machine							
	drawings		X	X		X	X	X
IPM-03	Identifying hydraulic and pneumatic							
	drawings		X			X	X	X
IPM-04	Using machine drawings in the main-							
	tenance of machinery and equipment		X	X				
IPM-05	Reading building drawings		X					
IPM-06	Reading electrical drawings		X		X			
IPM-07	Reading pipe system drawings		X					
IPM-08	Reading sheet metal drawings		X	X				
IPM-09	Using shop math to interpret blue-							
	prints		X	X				
IPM-10	Sketching schematic diagrams		X	X	X			
IPM-11	Identifying types of schematics used							
	in plant engineering		X		X			

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

POSSIBLE EXIT POINTS

TASK NO.	TASK NAME	DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
		DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
IPM-12	Identifying the symbols on electrical piping and fluid power diagrams		X					
IPM-13	Identifying guidelines for reading schematics		X		X			
IPM-14	Identifying electrical symbols		X		X			
IPM-15	Reading electrical diagrams		X		X			
IPM-16	Identifying piping symbols		X					
IPM-17	Reading piping schematics		X					
IPM-18	Identifying fluid power symbols		X					
IPM-19	Reading fluid power schematics		X					
IPM-20	Identifying welding symbols		X	X				
IPM-21	Identifying and using basic measuring tools		X	X				
IPM-22	Identifying and using wrenches and screwdrivers		X	X	X	X	X	X
IPM-23	Identifying and using pipefitting tools		X			X	X	X
IPM-24	Identifying and using plumbing tools		X			X	X	X
IPM-25	Identifying and using electrical tools		X		X	X	X	X

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

POSSIBLE EXIT POINTS

TASK NO.	TASK NAME	DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
		DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
IPM-26	Identifying and using cement, plaster							
	and glazing tools		X			X	X	X
IPM-27	Identifying and using woodworking							
	tools		X			X	X	X
IPM-28	Identifying and using sheet metal							
	tools		X	X		X	X	X
IPM-29	Identifying and using metalworking							
	tools		X	X		X	X	X
IPM-30	Identifying and using hoisting and							
	pulling tools		X	X		X	X	X
IPM-31	Identifying plant safety procedures		X	X	X	X	X	X
IPM-32	Observing safety precautions for							
	tools and equipment		X	X	X	X	X	X
IPM-33	Identifying machinery safeguards		X	X	X	X	X	X
IPM-34	Observing safety in handling							
	materials		X	X	X	X	X	X
IPM-35	Identifying work area safety pre-							
	cautions		X	X	X	X	X	X

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

POSSIBLE EXIT POINTS

TASK NO.	TASK NAME	DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
		DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
IPM-36	Identifying fire prevention procedures		X	X	X	X	X	X
IPM-37	Handling hazardous materials		X	X	X	X	X	X
IPM-38	Observing electrical safety precau-							
	tions		X	X	X	X	X	X
IPM-39	Identifying personal protection gear		X	X	X	X	X	X
IPM-40	Identifying basic principles of							
	lubrication		X	X		X	X	X
IPM-41	Identifying characteristics of lubri-							
	cants		X	X		X	X	X
IPM-42	Identifying additives, lubricating							
	action and bearing lubrication		X	X		X	X	X
IPM-43	Identifying oils and their applica-							
	tions		X	X		X	X	X
IPM-44	Identifying general purpose greases		X	X		X	X	X
IPM-45	Identifying special purpose greases		X	X		X	X	X
IPM-46	Identifying lubricating compounds		X	X		X	X	X
IPM-47	Identifying lubrication systems and							
	methods		X	X				

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

POSSIBLE EXIT POINTS

TASK NO.	TASK NAME	DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
		DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
IPM-48	Identifying automatic lubrication							
	methods		X	X		X	X	X
IPM-49	Identifying methods of lubricant							
	storage and handling		X	X		X	X	X
IPM-50	Identifying common couplings		X	X		X		
IPM-51	Identifying special couplings		X	X		X		
IPM-52	Identifying clutches		X	X		X		
IPM-53	Identifying V-belt drives		X	X		X	X	X
IPM-54	Identifying chain drives		X	X		X	X	X
IPM-55	Identifying speed reducers		X	X		X		
IPM-56	Identifying gears		X	X		X		
IPM-57	Identifying variable speed reducers		X					
IPM-58	Identifying brakes and motors		X	X		X		
IPM-59	Identifying principles of bearings							
	and shafts		X	X		X		
IPM-60	Identifying plain journal bearings		X	X		X		
IPM-61	Identifying anti-friction bearings		X	X		X		
IPM-62	Identifying ball and roller bearings		X	X		X		
IPM-63	Identifying specialized bearings		X	X		X		

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

TASK NO.	TASK NAME	POSSIBLE EXIT POINTS: DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
		DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
IPM-64	Identifying bearing seals		X	X		X	X	X
IPM-65	Identifying methods of bearing lubrication		X	X		X	X	X
IPM-66	Maintaining bearings		X			X		
IPM-67	Identifying pump application		X			X		
IPM-68	Selecting a pump		X			X		
IPM-69	Identifying centrifugal pumps		X			X		
IPM-70	Identifying propeller and turbine pumps		X			X		
IPM-71	Identifying rotary pumps		X			X		
IPM-72	Identifying reciprocating pumps		X			X		
IPM-73	Identifying metering pumps		X			X		
IPM-74	Identifying special purpose pumps		X			X		
IPM-75	Installing packings and maintaining pump seals		X			X	X	X
IPM-76	Performing pump maintenance		X			X		
IPM-77	Identifying piping systems and piping system maintenance		X			X	X	X
IPM-78	Maintaining metal pipe		X			X		

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

TASK NO.	TASK NAME	POSSIBLE EXIT POINTS: DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
		DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
IPM-79	Maintaining non-metallic piping		X		X			
IPM-80	Maintaining tubing		X		X			
IPM-81	Maintaining hoses		X		X			
IPM-82	Maintaining fittings		X		X			
IPM-83	Maintaining common valves		X		X			
IPM-84	Identifying specialized valves		X		X			
IPM-85	Maintaining strainers, filters and traps		X		X			
IPM-86	Maintaining pipeline by monitoring accessories		X		X			
IPM-87	Identifying principles of hydraulics		X		X			
IPM-88	Identifying hydraulic fluids		X		X			
IPM-89	Identifying strainers and filters in hydraulic systems		X		X			
IPM-90	Identifying reservoirs and accumulators in a hydraulic system		X		X			
IPM-91	Identifying hydraulic pumps on a system		X		X			

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

POSSIBLE EXIT POINTS

TASK NO.	TASK NAME	DOT NO.	DOT DESCRIPTIONS: Maintenance Mechanic 638.281-014	Maintenance Machinist 600.280-042	Electrical Repairer 825.281-014	Maintenance Repairer 899.281-014	Maintenance Mechanic Helper 633.684-018	Maintenance Repairer Helper 899.684-022
IPM-92	Identifying piping, tubing and fittings		X		X			
IPM-93	Identifying directional control valves		X		X			
IPM-94	Identifying pressure control valves		X		X			
IPM-95	Identifying cylinders in a hydraulic system		X		X			
IPM-96	Identifying hydraulic motors		X		X			
IPM-97	Troubleshooting hydraulic systems using schematics		X		X			
IPM-98	Reading hydraulic schematic diagrams		X		X			
IPM-99	Installing hydraulic components		X		X			
IPM-100	Installing pipes and tubes		X		X			
IPM-101	Selecting hydraulic fluids		X		X			
IPM-102	Planning system maintenance		X		X			
IPM-103	Troubleshooting hydraulic systems (diagnostic techniques)		X		X			
IPM-104	Troubleshooting valves		X		X			
IPM-105	Troubleshooting cylinders		X		X			

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

POSSIBLE EXIT POINTS

TASK NO.	TASK NAME	DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
		DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
IPM-106	Troubleshooting pumps and motors		X		X			
IPM-107	Identifying pneumatic principles		X		X			
IPM-108	Identifying reciprocating compressors		X		X			
IPM-109	Identifying rotary compressors		X		X			
IPM-110	Identifying primary air treatment in pneumatic systems		X		X			
IPM-111	Identifying secondary air treatment methods		X		X			
IPM-112	Identifying piping, hoses and fittings used in pneumatic systems		X		X			
IPM-113	Identifying control valves		X		X			
IPM-114	Identifying pressure relief valves		X		X			
IPM-115	Identifying cylinders		X		X			
IPM-116	Identifying motors		X		X			
IPM-117	Identifying components of penumatic systems		X		X			
IPM-118	Reading pneumatic schematic diagrams		X		X			
IPM-119	Installing system components		X		X			

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

TASK NO.	TASK NAME	POSSIBLE EXIT POINTS: DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
		DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
IPM-120	Identifying procedures for pneumatic system maintenance		X		X			
IPM-121	Determining system failures		X		X			
IPM-122	Troubleshooting air compressors		X		X			
IPM-123	Troubleshooting control valves		X		X			
IPM-124	Troubleshooting cylinders		X		X			
IPM-125	Troubleshooting air motors		X		X			
IPM-126	Troubleshooting pneumatic and hydraulic systems		X		X			
Duty II:	Electrical Maintenance							
EL-01	Identifying basic electrical theory		X		X	X	X	X
EL-02	Determining transformer polarity		X		X	X		
EL-03	Connecting to and operating dual voltage single phase transformers		X		X			
EL-04	Connecting single phase transformers in series		X		X			

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

TASK NO.	TASK NAME	POSSIBLE EXIT POINTS: DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
		DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
EL-05	Connecting single transformers in parallel		X		X			
EL-06	Determining the KVA rating of single phase transformers		X		X			
EL-07	Determining the KVA rating of three phase transformers		X		X			
EL-08	Hooking up and operating a one phase auto transformer		X		X			
EL-09	Hooking up a one phase buck booster		X		X			
EL-10	Hooking up a three phase transformer		X		X			
EL-11	Hooking up a three phase auto transformer		X		X			
EL-12	Hooking up a three phase transformer bank connected Wye/Wye		X		X			
EL-13	Hooking up a three phase transformer bank connected Delta/Delta		X		X			
EL-14	Hooking up a three phase bank of transformers open Delta		X		X			

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

TASK NO.	TASK NAME	POSSIBLE EXIT POINTS						
		DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
		DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
EL-15	Hooking up a three phase transformer bank connected Wye/Delta		X		X			
EL-16	Hooking up a three phase transformer bank connected Delta/Wye		X		X			
EL-17	Hooking up a three phase transformer bank; reversed voltage		X		X			
EL-18	Hooking up transformers for special applications		X		X			
EL-19	Calculating service load for a small commercial building		X		X			
EL-20	Locating service entrance equipment and writing specifications		X		X			
EL-21	Selecting a service entrance conductor		X		X			
EL-22	Calculating service conduits		X		X			
EL-23	Installing service conduits		X		X			
EL-24	Installing service entrance conductors		X		X			
EL-25	Selecting and installing meters		X		X			
EL-26	Selecting and installing panels		X		X			

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

POSSIBLE EXIT POINTS

TASK NO.	TASK NAME	DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
		DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
EL-27	Calculating and installing motor branch circuits		X		X			
EL-28	Installing and operating subfeeders and panels		X		X	X		
EL-29	Grouping outlets onto branch circuits		X		X			
EL-30	Installing specific purpose outlets		X		X	X		
EL-31	Calculating branch circuit conductors and overcurrent protection		X		X			
EL-32	Installing branch circuits and controls		X		X			
EL-33	Selecting conduit		X		X			
EL-34	Installing conduit under a concrete slab		X		X			
EL-35	Installing outlet, junction and conduitlets		X		X			
EL-36	Installing branch circuits and controls for air conditioning and heating		X		X			

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

TASK NO.	TASK NAME	POSSIBLE EXIT POINTS: DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
		DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
EL-37	Selecting and installing branch circuits for three phase water heaters		X		X			
EL-38	Planning and performing site work for a small industrial facility		X		X			
EL-39	Making calculations for electric motors, welders and heaters		X		X			
EL-40	Calculating the 120 and 277 volt lighting load		X		X			
EL-41	Calculating and selecting receptacles for 120/208 volt loads		X		X			
EL-42	Calculating size for and selecting and installing a Buss-Duct		X		X			
EL-43	Selecting and installing a three phase, four wire 480v panel		X		X			
EL-44	Selecting the correct transformer bank		X		X			
EL-45	Selecting and installing a 480v/280-120 three phase four wire service		X		X			
EL-46	Installing metering equipment		X		X			

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

POSSIBLE EXIT POINTS

TASK NO.	TASK NAME	DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
		DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
EL-47	Selecting and installing panels and selecting distribution equipment		X		X			
EL-48	Selecting and installing a 277v flourescent light		X		X			
EL-49	Determining sizes and types of feeders and overcurrent protection devices		X		X			
EL-50	Installing a branch circuit for welders		X		X			
EL-51	Operating a split phase motor		X		X			
EL-52	Operating a capacitor start motor		X		X			
EL-53	Operating a universal motor		X		X			
EL-54	Operating a three phase induction motor		X		X			
EL-55	Operating a three phase synchronous motor		X		X			
EL-56	Operating a three phase, one winding, two speed motor		X		X			
EL-57	Operating a three phase, two winding, two speed motor		X		X			

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

POSSIBLE EXIT POINTS

TASK NO.	TASK NAME	DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
		DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
EL-58	Operating single and three phase alternators		X		X			
EL-59	Operating an induction regulator		X		X			
EL-60	Operating a rotary frequency changer		X		X			
EL-61	Operating a synchronous rotary converter		X		X			
EL-62	Operating a rotary converter		X		X			
EL-63	Operating DC motors		X		X			
EL-64	Operating and checking load characteristics of DC generators		X		X			
EL-65	Correcting power factors		X		X			
EL-66	Hooking up and operating gear motors		X		X			
EL-67	Selecting correct machine drive		X		X			
EL-68	Installing ventilator fans		X		X			
EL-69	Identifying motor leads		X		X			
EL-70	Identifying hazardous wiring locations		X		X			
EL-71	Operating a power actuated tool		X		X			

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

TASK NO.	TASK NAME	POSSIBLE EXIT POINTS						
		DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
		DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
Duty III:	Machine Shop							
MS-01	Laying out metal surfaces		X	X				
MS-02	Identifying jig buttons		X	X				
MS-03	Using the sine bar		X	X				
MS-04	Using the bevel protractor		X	X				
MS-05	Using steel rules		X	X				
MS-06	Using the micrometer		X	X				
MS-07	Reading a vernier scale		X	X				
MS-08	Using dial indicators, center testers and speed indicators		X	X				
MS-09	Using precision gage blocks, tapered ring, plug and snap gages		X	X				
MS-10	Identifying and using hand hacksaws		X	X				
MS-11	Using abrasives and applying compounds		X	X				
MS-12	Identifying and using files		X	X				
MS-13	Scraping flat and curved bearing surfaces		X	X				

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

TASK NO.	TASK NAME	POSSIBLE EXIT POINTS						
		DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
		DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
MS-14	Using hammers and screwdrivers for hand bench use		X	X				
MS-15	Identifying and using wrenches		X	X				
MS-16	Using bench vises and clamps		X	X				
MS-17	Identifying and using chipping tools		X	X				
MS-18	Using hand taps, dies and hand reamers		X	X				
MS-19	Identifying power tool safety practices		X	X				
MS-20	Assembling and fitting		X	X				
MS-21	Identifying fasteners		X	X				
MS-22	Using thread, center, fillet and radius gages		X	X				
MS-23	Identifying lubricants and greases		X	X				
MS-24	Performing machine maintenance		X	X				
MS-25	Identifying bench work safety		X	X				
MS-26	Identifying parts and functions of the drilling machine		X	X				

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

TASK NO.	TASK NAME	POSSIBLE EXIT POINTS: DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
		DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
MS-27	Identifying safety practices and pre-							
	cautions when using the drilling							
	machine		X	X				
MS-28	Identifying work-holding devices and							
	set ups		X	X				
MS-29	Identifying and using the drill bit							
	holding devices		X	X				
MS-30	Identifying drill bit		X	X				
MS-31	Identifying cutting feeds and speeds		X	X				
MS-32	Identifying principles of straight							
	drilling		X	X				
MS-33	Identifying and using coolants and							
	cutting compounds		X	X				
MS-34	Grinding and caring of drills		X	X				
MS-35	Identifying and using twist drill							
	gages		X	X				
MS-36	Identifying and using drill grinding		X	X				
MS-37	Identifying machine reamers		X	X				

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

TASK NO.	TASK NAME	POSSIBLE EXIT POINTS: DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
		DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
MS-38	Performing machine reaming with the drilling machine		X	X				
MS-39	Identifying principles of boring and counterboring		X	X				
MS-40	Using the drill press in spot facing operations		X	X				
MS-41	Performing counter sinking and center drilling operations		X	X				
MS-42	Identifying lathe safety		X	X				
MS-43	Identifying lathes		X	X				
MS-44	Identifying work-holding devices		X	X				
MS-45	Identifying cutting tools		X	X				
MS-46	Identifying measuring tools		X	X				
MS-47	Identifying lathe attachments		X	X				
MS-48	Calculating cutting feeds and speeds on the lathe		X	X				
MS-49	Determining RPM		X	X				
MS-50	Centering stock		X	X				
MS-51	Identifying principles of facing		X	X				

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TASK NO.	TASK NAME	POSSIBLE EXIT POINTS						
		DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
		DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
MS-52	Identifying principles of straight turning and turning to shoulders		X	X				
MS-53	Identifying chucks		X	X				
MS-54	Performing form turning operations		X	X				
MS-55	Identifying principles of faceplate work		X	X				
MS-56	Using draw-in collets		X	X				
MS-57	Identifying principles of drilling		X	X				
MS-58	Identifying machine reamers		X	X				
MS-59	Performing reaming operations on the engine lathe		X	X				
MS-60	Performing boring operations on the engine lathe		X	X				
MS-61	Identifying and using mandrels		X	X				
MS-62	Performing knurling operations on the engine lathe		X	X				
MS-63	Performing cutting off operations on the engine lathe		X	X				
MS-64	Identifying thread cutting devices		X	X				

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

TASK NO.	TASK NAME	POSSIBLE EXIT POINTS						
		DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
		DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
MS-65	Identifying the parts of a thread		X	X				
MS-66	Identifying American National thread standards		X	X				
MS-67	Computing American National thread form		X	X				
MS-68	Computing sharp V-thread formulas		X	X				
MS-69	Identifying acme threads		X	X				
MS-70	Using the acme tap		X	X				
MS-71	Identifying square threads		X	X				
MS-72	Identifying classes of fits of screw threads		X	X				
MS-73	Using thread gages		X	X				
MS-74	Using a thread micrometer		X	X				
MS-75	Measuring threads using the three-wire method		X	X				
MS-76	Cutting threads with an even geared lathe		X	X				
MS-77	Cutting threads on a lathe which is not even geared		X	X				

TASK LISTING BY DOT CODE

INDUSTRIAL MAINTENANCE

TASK NO.	TASK NAME	POSSIBLE EXIT POINTS: DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
		DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
MS-78	Cutting threads on a quick-change gear lathe		X	X				
MS-79	Identifying multiple lead screw threads		X	X				
MS-80	Cutting left hand threads		X	X				
MS-81	Determining a tap drill size		X	X				
MS-82	Cutting internal threads and performing tapping operation		X	X				
MS-83	Identifying principles of taper turning		X	X				
MS-84	Computing tapers		X	X				
MS-85	Measuring short tapers		X	X				
MS-86	Gaging inside and outside tapers		X	X				
MS-87	Tapering using the offset tailstock method		X	X				
MS-88	Cutting a taper using the compound rest		X	X				
MS-89	Cutting a taper using the taper attachment		X	X				

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TASK NO.	TASK NAME	POSSIBLE EXIT POINTS DOT NO.	DOT DESCRIPTIONS 638.281-014 Maintenance Mechanic	 600.280-042 Maintenance Machinist	 825.281-014 Electrical Repairer	 899.281-014 Maintenance Repairer	 633.684-018 Maintenance Mechanic Helper	 899.684-022 Maintenance Repairer Helper
MS-90	Boring or turning internal tapers		X	X				
MS-91	Identifying coolants and cutting compounds.		X	X				
MS-92	Identifying lubricants		X	X				
Duty IV:	Welding							
WLD-01	Identifying and using welding symbols		X					
WLD-02	Using welding related shop tools		X					
WLD-03	Identifying and preparing metals for welding		X					
WLD-04	Measuring welding materials		X					
WLD-05	Using clamps and jigs		X					
WLD-06	Reading blueprints		X					

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Duty V:	Oxyacetylene Welding, Cutting,							
	Brazing and Soldering							
OXA-01	Following safety procedures and							
	regulations for oxyacetylene welding		X					
OXA-02	Using oxyacetylene cylinders and							
	gases		X					
OXA-03	Inspecting oxygen and acetylene							
	regulators		X					
OXA-04	Selecting and maintaining oxyace-							
	tylene torches and tips		X					
OXA-05	Setting up and lighting the oxyace-							
	tylene torch		X					
OXA-06	Carrying a puddle without a filler							
	rod		X					
OXA-07	Welding an outside corner joint							
	without a filler rod		X					
OXA-08	Making beads with filler rods		X					
OXA-09	Welding butt joints		X					

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INDUSTRIAL MAINTENANCE

TASK NO.	TASK NAME	POSSIBLE EXIT POINTS						
		DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
		DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
OXA-10	Welding lap joints		X					
OXA-11	Welding T-joints		X					
OXA-12	Setting up the oxyacetylene apparatus for flame cutting		X					
OXA-13	Cutting with an oxyacetylene cutting torch		X					
OXA-14	Piercing and cutting holes		X					
OXA-15	Cutting with an automatic oxyacetylene cutting machine							
OXA-16	Welding beads with brass rods		X					
OXA-17	Brazing a lap joint using oxyacetylene apparatus		X					
OXA-18	Brazing with silver		X					
OXA-19	Soldering copper, sheet metal and other metals		X					
OXA-20	Welding cast iron		X					
OXA-21	Cutting and welding pipe		X					

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INDUSTRIAL MAINTENANCE

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Duty VI:	Shielded Arc Welding							
ARC-01	Selecting and setting up shielded arc welding apparatus		X					
ARC-02	Welding string and weave beads		X					
ARC-03	Arc welding string beads and padding a plate		X					
ARC-04	Arc welding lap joints		X					
ARC-05	Arc welding butt joints		X					
ARC-06	Shield arc welding T-fillet joints		X					
ARC-07	Testing arc welded joints		X					
Duty VII:	Air Conditioning and Heating							
AC-01	Identifying major components and functions of air conditioning systems		X					
AC-02	Applying basic air principles		X					
AC-03	Calculating heat loads		X					
AC-04	Applying principles of air movement		X					

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INDUSTRIAL MAINTENANCE

POSSIBLE EXIT POINTS

TASK NO.	TASK NAME	DOT NO.	DOT DESCRIPTIONS: Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
			638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
AC-05	Servicing air filtering systems		X					
AC-06	Installing condensate drains		X					
AC-07	Installing residential and mobile home package air conditioning units		X					
AC-08	Installing split system air conditioning units		X					
AC-09	Installing add-on split air conditioning systems		X					
AC-10	Troubleshooting compressor burnout		X					
AC-11	Troubleshooting fans and fan motors		X					
AC-12	Performing pre-season start-up and air conditioner service		X					
AC-13	Troubleshooting air conditioner refrigeration cycle		X					
AC-14	Troubleshooting air conditioner electrical cycle		X					
AC-15	Troubleshooting air conditioner air movement		X					
AC-16	Applying principles of the heat pump		X					

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INDUSTRIAL MAINTENANCE

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		DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
		DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
AC-17	Evacuating and charging a heat pump		X					
AC-18	Installing a reversing valve		X					
AC-19	Tracing the heat pump refrigeration		X					
	cycle		X					
AC-20	Installing electrical circuits		X					
AC-21	Adjusting and repairing defrost							
	controls		X					
AC-22	Installing package heat pumps		X					
AC-23	Installing split-system heat pumps		X					
Duty VIII: Heating								
HE-01	Applying principles of electric							
	furnaces and controls		X					
HE-02	Installing electric furnaces		X					
HE-03	Troubleshooting electric furnaces		X					
HE-04	Applying gas fuel combustion and							
	safety principles		X					

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		DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
		DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
HE-05	Identifying major components and functions of gas heating systems		X					
HE-06	Checking gas sources		X					
HE-07	Applying gas piping principles		X					
HE-08	Installing and adjusting gas regulators		X					
HE-09	Installing and servicing gas valves		X					
HE-10	Installing and servicing pilot ignition devices		X					
HE-11	Installing and servicing combination gas valves		X					
HE-12	Servicing gas burners		X					
HE-13	Inspecting and adjusting temperature rise of heat exchangers		X					
HE-14	Venting gas heating systems		X					
HE-15	Servicing gas furnace electrical controls		X					
HE-16	Determining combustion efficiency		X					
HE-17	Performing a pre-season check-up and start-up on a gas furnace		X					

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		DOT DESCRIPTIONS	Maintenance Mechanic	Maintenance Machinist	Electrical Repairer	Maintenance Repairer	Maintenance Mechanic Helper	Maintenance Repairer Helper
		DOT NO.	638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
HE-18	Troubleshooting the gas heating system		X					
HE-19	Identifying types of fuel oil and their principles of combustion		X					
HE-20	Designing and installing oil piping		X					
HE-21	Installing oil burners		X					
HE-22	Installing and servicing transformers and electrodes		X					
HE-23	Installing oil pumps		X					
HE-24	Servicing blower, nozzle, motor and coupling		X					
HE-25	Performing the combustion efficiency test		X					
HE-26	Installing controls		X					
HE-27	Performing pre-season start-up and check-up on an oil burning heating system		X					
HE-28	Troubleshooting the oil burning heating system		X					

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Duty IX:	Sheet Metal							
SM-01	Identifying materials used in sheet metalwork		X					
SM-02	Developing sheet metal patterns		X					
SM-03	Cutting sheet metal		X					
SM-04	Bending sheet metal by hand		X					
SM-05	Bending metal on a bar folder or brake		X					
SM-06	Roll-forming sheet metal		X					
SM-07	Making seams		X					
SM-08	Using the rotary machine		X					
SM-09	Fastening sheet metal		X					
Duty X:	Vehicle Maintenance							
VM-01	Reading and interpreting the shop service manual		X					
VM-02	Identifying and maintaining shop tools and equipment		X					

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POSSIBLE EXIT POINTS

TASK NO.	TASK NAME	DOT NO.	DOT DESCRIPTIONS
		638.281-014	Maintenance Mechanic
		600.280-042	Maintenance Machinist
		825.281-014	Electrical Repairer
		899.281-014	Maintenance Repairer
		633.684-018	Maintenance Mechanic Helper
		899.684-022	Maintenance Repairer Helper
VM-03	Using precision measurement tools and equipment	X	
VM-04	Demonstrating an understanding of engine theories of operation	X	
VM-05	Demonstrating a knowledge of electricity fundamentals	X	
VM-06	Demonstrating an understanding of fuels	X	
VM-07	Demonstrating an understanding of lubricants	X	
VM-08	Demonstrating an understanding of hardware and fasteners	X	
VM-09	Demonstrating basic metals operations	X	
VM-10	Demonstrating welding and soldering techniques	X	

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			638.281-014	600.280-042	825.281-014	899.281-014	633.684-018	899.684-022
Duty XI:	Automotive Systems Repair							
VM-11	Checking and changing engine oil and							
	oil filter		X					
VM-12	Checking fluid level and refilling							
	transmission and rear end		X					
VM-13	Lubricating chassis and components		X					
VM-14	Checking and replacing windshield							
	wiper blades		X					
VM-15	Repairing tires and tubes		X					
VM-16	Replacing light bulbs and fuses		X					
VM-17	Washing and waxing vehicle		X					
VM-18	Adjusting fuel/air mixtures and							
	mechanical linkage		X					
VM-19	Cleaning or replacing fuel air and							
	air filters		X					
VM-20	Removing carburetor from engine		X					
VM-21	Disassembling, cleaning and inspecting							
	carburetor		X					

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VM-22	Reassembling and testing carburetor		X					
VM-23	Testing and replacing fuel pumps		X					
VM-24	Servicing fuel tank, lines, hoses and fuel level monitoring devices		X					
VM-25	Diagnosing fuel system problems		X					
VM-26	Inspecting, selecting and installing spark plugs		X					
VM-27	Timing the ignition		X					
VM-28	Inspecting and replacing circuit wiring, distributor cap and rotor		X					
VM-29	Testing, removing and replacing battery ignition components		X					
VM-30	Testing, removing and replacing electronic ignition components		X					
VM-31	Using and interpreting the ignition analyzer		X					
VM-32	Diagnosing ignition system problems		X					
VM-33	Servicing battery and cables		X					

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		638.281-014	Maintenance Mechanic	600.280-042	Maintenance Machinist	825.281-014	Electrical Repairer	899.281-014	Maintenance Repairer	633.684-018	Maintenance Mechanic Helper	899.684-022	Maintenance Repairer Helper
Duty XII: Carpentry													
C-01	Reading a rule	X				X							
C-02	Reading a scale	X				X							
C-03	Reading orthographic drawings	X				X							
C-04	Identifying elevations	X				X							
C-05	Identifying symbols	X				X							
C-06	Using hand tools (tooth cutting, edge cutting, boring, assembly and smoothing tools)	X				X							
C-07	Using measuring tools	X				X							
C-08	Using fasteners (nails, screws, glue)	X				X							
C-09	Using portable power tools (saws, drills, router and sanders)	X				X							
C-10	Surfacing stock, jointing edges and dressing lumber to thickness	X				X							
C-11	Ripping stock	X				X							
C-12	Cutting stock to length	X				X							
C-13	Using the band saw and scroll saw	X				X							

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		638.281-014	Maintenance Mechanic	600.280-042	Maintenance Machinist	825.281-014	Electrical Repairer	899.281-014	Maintenance Repairer	633.684-018	Maintenance Mechanic Helper	899.684-022	Maintenance Repairer Helper
C-14	Using the shaper and overarm router	X				X					
C-15	Making wood joints	X				X					
C-16	Using the wood lathe to turn stock	X				X					
C-17	Boring holes and cutting plugs	X				X					
C-18	Sanding flat surfaces	X				X					

Federal law prohibits discrimination on the basis of race, color or national origin (Title VI of the Civil Rights Act of 1964); sex (Title IX of the Educational Amendments of 1972 and Title II of the Vocational Education Amendments of 1976); or handicap (Section 504 of the Rehabilitation Act of 1973) in educational programs or activities receiving federal financial assistance.

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The following individuals have been designated as the employees responsible for coordinating the department's effort to implement this nondiscriminatory policy.

Title II - Loydia Webber, Vocational Equity Coordinator
Title VI - Peyton Williams Jr., Associate Superintendent of State Schools and Special Services
Title IX - Evelyn Rowe and Myra Tolbert, Coordinators
Section 504 - Jane Lee, Coordinator of Special Education

Inquiries concerning the application of Title II, Title VI, Title IX or Section 504 to the policies and practices of the department may be addressed to the persons listed above at the Georgia Department of Education, State Office Building, Atlanta 30334; to the Regional Office for Civil Rights, Atlanta 30323; or to the Director, Office for Civil Rights, Education Department, Washington, D.C. 20201.